

Remarks

Applicants respectfully request reconsideration of the present application in view of the following remarks. No claims have been amended, cancelled or added. Therefore, claims 1-16 are pending in the present application.

Claims 1-16 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,015,103 to Kotkowicz ("the Kotkowicz reference") in view of U.S. Patent No. 4,687,142 to Sasao et al. ("the Sasao reference") and U.S. Patent No. 5,080,287 to Takeda et al. ("the Takeda reference").¹ Applicants respectfully traverse this rejection.

The Federal Circuit has stated that a prima facie case of obviousness is not met unless "the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." *In re Bell*, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993) (quoting *In re Rinehart*, 189 U.S.P.Q. 143, 147 (C.C.P.A. 1976)). Therefore, there must be some reason, suggestion or motivation from the prior art as a whole for a person of ordinary skill in the art to combine or modify the prior art. See *In re Geiger*, 815 F.2d 686 (Fed Cir. 1987).

Applicants submit that there is no motivation or suggestion to combine the Kotkowicz, Sasao and Takeda references. In rejecting claims 1-16, the Examiner introduced the Kotkowicz reference to teach a director plate, but indicated that this reference does not teach the roughness of the injection ports. See *Office Action*, pg.

¹ In the Office Action, the Examiner states that claims 1-16 have been rejected based, in part, on the Sasao reference. However, in the discussion portion of the Office Action, the Examiner mentions a reference identified by "Assai." There is nothing in the Office Action or the Notice of References Cited to indicate a patent or publication number associated with an Assai reference. Since the Examiner did not mention the Sasao reference in the discussion, Applicants will assume that the Examiner meant to use the Sasao reference in the discussion instead of the Assai reference.

2. The Examiner then introduced the Sasao reference which discloses a fuel injection valve having a fuel discharge port (11) that may be honed to a surface roughness of about $0.1\mu\text{m}$. See *Sasao*, Col. 2, lines 54-57. First, the Sasao reference relates to honing a discharge port for a fuel injection valve, not a director plate. Second, the fuel discharge port (11) in the Sasao reference is imparted with a honing finish so that the amount of fuel discharged by the fuel injector out of the fuel discharge port (11) can be precisely controlled. See *Sasao*, Col. 2, lines 64-68. Therefore, honing the injection ports (56) on the director plate in the Kotkowicz reference in accordance with the teachings of the Sasao reference would operate to precisely control the amount of fuel being discharged from the director plate (54), not prevent the accumulation of deposits of fuel-related materials around the exits of the injection ports (56). Thus, there is no suggestion to combine the teachings of the Sasao reference with the director plate disclosed in the Kotkowicz reference.

The Examiner also suggested combining the Takeda reference with the Kotkowicz reference. The Takeda reference mentions that the metering portion of a fuel injection valve may be brought to a surface roughness of $0.1\mu\text{m}$ to eliminate catching of residue at the fuel metering portion. See *Takeda*, Col. 1, lines 66-68. However, the Takeda reference goes on to state that it "causes remarkable machining difficulties to bring the surface roughness to $0.1\mu\text{m}$ or less." *Takeda*, Col. 2, lines 1-2. In fact, one of the objects of the Takeda reference is to eliminate the necessity for highly precise machining. See *Takeda*, Col. 2, lines 9-10. Since the Takeda reference teaches away from this combination, one skilled in the art would not be motivated to take the teaching in the Takeda reference (i.e., machining of the

metering portion of a fuel injection valve) and apply it to the injection ports (56) in the director plate (54) in the Kotkowicz reference. For at least this reason, Applicants submit that the Takeda reference is not properly combinable with the Kotkowicz reference.

Since the Takeda and Sasao references are not properly combinable with the Kotkowicz reference, Applicants submit that a prima facie case of obviousness has not been established. Thus, Applicants request that the rejection of claims 1-16 be withdrawn.

Even if the Sasao and Takeda references are properly combinable with the Kotkowicz reference, the combination of these references still does not teach or suggest each of the limitations in the present invention. The Examiner has the initial burden of supplying the factual basis for its rejection and may not, because it may doubt that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in its factual basis. See *Warner*, 379 F.2d at 1017, 154 USPQ at 178. A rejection based upon 35 U.S.C. § 103(a) must rest on a factual basis. See *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968).

Claim 1 is directed to a director plate for use in a fuel injector for an internal combustion engine. The plate has fuel inlet and fuel exit surfaces and has at least one passage. The at least one passage has a passage wall formed between the inlet and exit surfaces for conduction of fuel through the plate between a passage inlet and a passage exit of the at least one passage. A numerical surface roughness

of the exit surface adjacent the passage exit of the at least one passage is less than about $(R_a) 0.2\mu\text{m}$.

None of the cited references taken alone or in combination teach or suggest a director plate having a numerical surface roughness of an exit surface adjacent to a passage exit of at least one passage is less than about $(R_a) 0.2\mu\text{m}$ as recited in claim 1. If the teachings of the Sasao reference were applied to the director plate in the Kotkowicz reference, the injection ports (56) in the Kotkowicz reference would be imparted with a honing finish so that the amount of fuel discharged from the injection ports (56) can be precisely controlled. However, the Sasao reference does not disclose honing the exit surface adjacent to the injection ports (56). Likewise, there has been no factual evidence presented to indicate that the Takeda reference states that the exit surface of the director plate be honed to a numerical roughness of less than about $(R_a) 0.2\mu\text{m}$. For this additional reason, Applicants request that the rejection of claim 1 be withdrawn. As claims 2-6 depend either directly or indirectly from claim 1, these claims are also not taught or suggested by the references of record for at least the same reasons set forth with respect to claim 1.

Claim 7 is directed to a fuel injector for use in an internal combustion engine. The fuel injector comprises a director plate having fuel inlet and fuel exit surfaces and having at least one passage. The at least one passage has a passage wall formed between the inlet and exit surfaces for conduction of fuel through the plate between a passage inlet and a passage exit of the at least one passage. A numerical surface roughness of the exit surface adjacent the passage exit of the at least one passage is less than about $(R_a) 0.2\mu\text{m}$.

For at least the same reason set forth above with respect to claim 1, claim 7 is not taught or suggested by the references of record. Specifically, none of the references of record teach or suggest a director plate having a numerical surface roughness of an exit surface adjacent to a passage exit of at least one passage is less than about $(R_a) 0.2\mu\text{m}$ as recited in claim 7. As claims 8-10 depend either directly or indirectly from claim 7, these claims are also not taught or suggested by the references of record for at least the same reasons set forth with respect to claim 7.

Claim 13 is directed to a director plate for use in a fuel injector for an internal combustion engine. The plate has fuel inlet and fuel exit surfaces and has at least one passage. The at least one passage has a passage wall formed between the inlet and exit surfaces for conduction of fuel through the plate between a passage inlet and a passage exit of the at least one passage. A juncture between the passage wall and the fuel exit surface defines an exit corner, wherein a numerical surface roughness of the exit corner is less than about $(R_a) 0.2\mu\text{m}$.

In rejecting claim 13, the Examiner stated that the Takeda reference discloses that the surface roughness will prevent the catching of residue on the exit corners. *See Office Action*, pg. 2. However, as stated above, the Takeda reference actually teaches away from reducing surface roughness to prevent residue deposition and accumulation because it "causes remarkable machining difficulties" *Takeda*, Col. 1, lines 66-68; Col. 2, lines 1-2. Therefore, one skilled in the art would not be motivated to include a exit corner on a director plate having a numerical surface roughness of less than about $(R_a) 0.2\mu\text{m}$ in view of the Takeda reference. As such,

Applicants request that the rejection of claim 13 be withdrawn. As claim 14 depends from claim 13, claim 14 is also not taught or suggested by the references of record for at least the same reason set forth with respect to claim 13.

Claim 15 is directed to an internal combustion engine comprising a fuel injector including a director plate having fuel inlet and fuel exit surfaces and having at least one passage. The at least one passage has a passage wall formed between the inlet and exit surfaces for conduction of fuel through the plate between a passage inlet and a passage exit of the at least one passage. A numerical surface roughness of the exit surface adjacent the passage exit of the at least one passage is less than about $(R_a) 0.2\mu\text{m}$.

For at least the same reason set forth above with respect to claim 1, claim 15 is not taught or suggested by the references of record. Specifically, none of the references of record teach or suggest a director plate having a numerical surface roughness of an exit surface adjacent to a passage exit of at least one passage is less than about $(R_a) 0.2\mu\text{m}$ as recited in claim 15. Thus, Applicants request that the rejection of claim 15 be withdrawn. As claim 16 depends from claim 15, this claim is also not taught or suggested by the references of record for at least the same reason set forth with respect to claim 15.

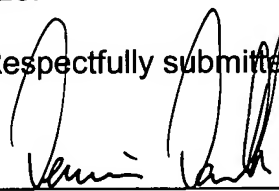
Conclusion

In light of the foregoing, Applicants submit that claims 1-16 are in condition for allowance and such allowance is respectfully requested. Should the Examiner feel that any unresolved issues remain in this case, the undersigned may be contacted at the telephone number listed below to arrange for an issue resolving conference.

Applicants do not believe that any fee is due at this time, however, the Commissioner is hereby authorized to charge any fee that may have been overlooked, to Deposit Account No. 10-0223.

Respectfully submitted,

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